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IN THIS ISSUE

THE AGRICULTURAL POTENTIALITIES OF MANCHURIA

AUSTRALIAN RURAL RECONSTRUCTION AND WORLD MARKETS

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CORRECTION: FOREIGN AGRICULTURE, August 1944, p. 151, "Canadian Agricultural Policy"; Note that unit of quantity in table 2 should be 1,000 Canadian dollars.

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THE AGRICULTURAL POTENTIALITIES OF MANCHURIA . . .

By Raymond T Moyer*

Of the territories that Japan is expected to have to relinquish at the end of the war, few possess greater interest internationally than Manchuria. This interest is due in part to such considerations as its ice-free ports, its reserves of iron and timber, and its strategic location; but its agricultural potentialities are also important factors. These potentialities, furthermore, are of interest in the allied fight against Japan. With supplies of rice being increasingly cut off from the south, Japan has been rapidly developing Manchuria into a food base, and knowledge as to what is available for that purpose is important.

The name Manchuria has been used for some centuries by Western peoples as a designation for the territory located outside the Great Wall, northeast of China proper. The Chinese during more recent times have called it the Three Eastern Provinces, meaning Liaoning (Fengtien), Kirin, and Heilungkiang Provinces.

Under the Japanese after 1931 this territory, together with that of a fourth Province, Jehol, was organized into a political entity to which the name "Manchoukuo" was given. Subsequently, the original four Provinces were subdivided into a larger number of administrative units, also referred to as provinces. Fourteen such provinces were defined in 1934. Later the number was increased to 19, by creating new provinces out of parts of those formerly established. (See fig. 1.)

As used in this discussion, Manchuria refers to the territory included in the four original Provinces of Liaoning (Fengtien), Kirin, Heilungkiang, and Jehol. A more proper designation might be one sometimes used by the Chinese, the Four Northeastern Provinces. Together they cover an area estimated at 496,531 square miles (*2*),[1] which is greater than the combined areas of Germany, France, Belgium, and the Netherlands. The population in 1940 was stated to be about 43 million, at least 90 percent of which was Chinese.

A distinction is often made between North Manchuria and South Manchuria. No sharp line of demarcation divides these regions; but by North Manchuria is usually meant the region served by the former Chinese Eastern Railway, with Harbin at its hub, and the area in which Russian interest was once strong. By South Manchuria is usually meant the area served by the South Manchuria Railway, with Mukden at its hub, and where, by contrast, Japanese interest was strong. The 44th parallel is sometimes used as a line dividing the two. For the purposes of this study, a division has been adopted following provincial boundaries which lie roughly along this degree of latitude.

NATURAL FACTORS AFFECTING AGRICULTURE

Topographical Regions

Topographically, Manchuria is made up of plains, rugged mountains, rolling foothills, and elevated plateaus (fig. 2). At its center lies the Manchurian plain, most important of all the topographical areas from an agricultural point of view.

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* Office of Foreign Agricultural Relations.

[1] Italic numbers in parentheses refer to Literature Cited, p. 191.

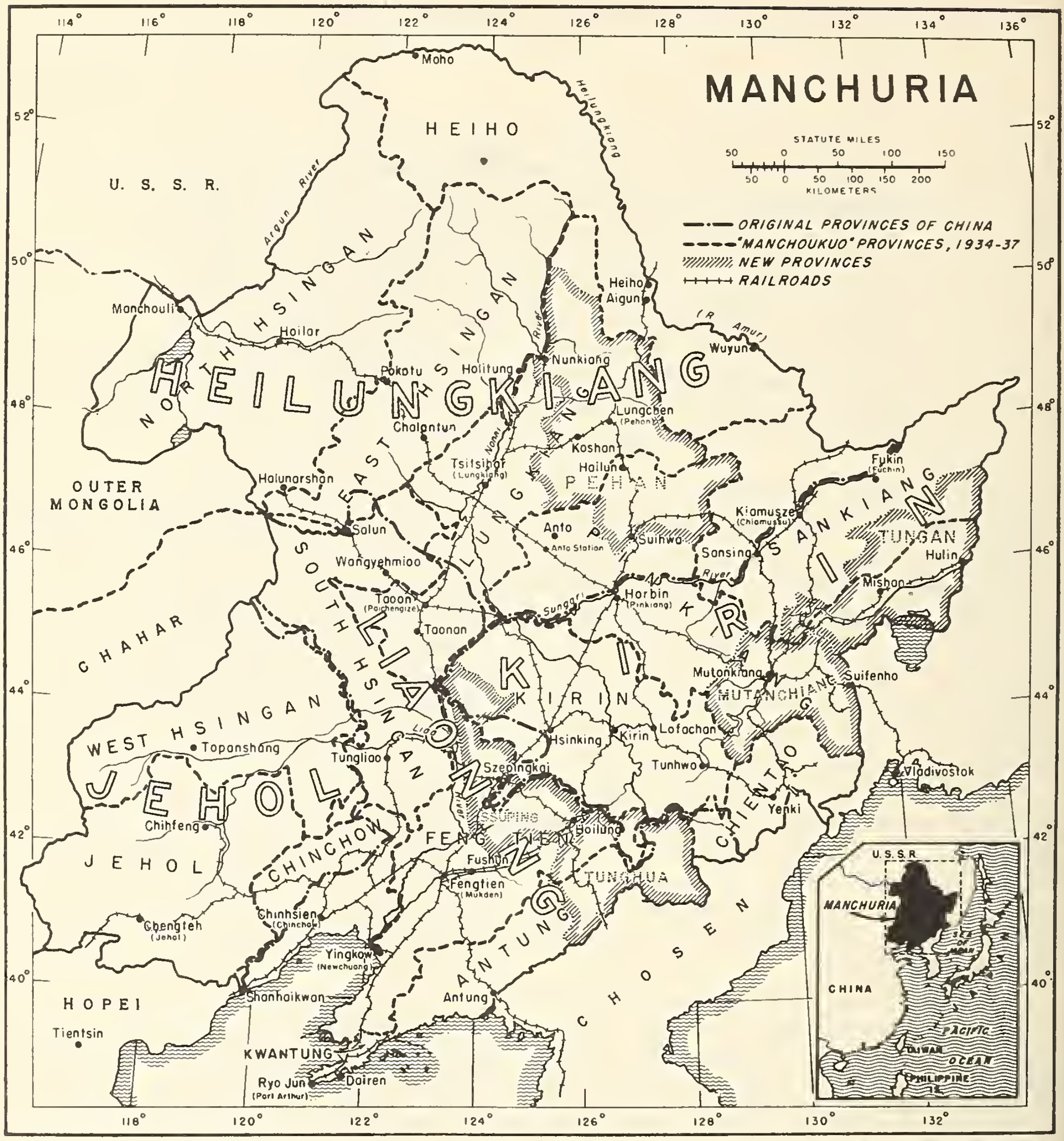

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FIGURE 1.–Reference map of Manchuria.

This is roughly rectangular in shape and made up of undulating terrain, together with associated level stream valleys. In elevation it does not exceed 1,000 feet, and its total area has been estimated at 137,637 square miles, or about 28 percent of all Manchuria (*3, pp. 214-215*).

Eastward are the East Manchurian Mountains, reaching to 8,000 feet in elevation. In some places the rugged peaks and precipitous cliffs combine to make scenes of exceptional beauty. Climatic conditions favor the growth of forests, which have been wastefully removed from large areas; but excellent timber still exists in the regions away from populated areas.

To the north and northwest of the Manchurian plain rugged mountains are found, roughly in the shape of an inverted L, reaching nearly to the borders of Mongolia and Siberia. The Great Khingan Range occupies the northwest. The term Little Khingan is sometimes restricted to the eastern extremity of the mountains that spread across northern Manchuria, most of this system being called Il-Khuri Alin. Timber, predominantly larch, covers the hills, but an extremely cold climate makes cultivated agriculture practically impossible over its greater part.

Mountains to the west of the plain form a continuation of the Great Khingan Range. South of the Chinese Eastern Railway, these grade into a series of high rounded hills only sparsely covered with trees; and still farther southward, until the mountains of Jehol are reached, they almost disappear. The low-lying hills of this region afford a natural passageway into Mongolia. The rolling hills and level valley floors are topographically suitable for cultivation, particularly along the margin of the plain; but the dryness of the climate makes it questionable whether much of this land should ever be cultivated.

Climate

Like that of North China, the climate of Manchuria derives certain of its distinctive characteristics from the essentially monsoonal character of the prevailing winds, which, in general, come from the east and south during the summer and from the west and northwest during the winter.

Temperature

Manchurian winters are very cold. Strong winds, blowing out of interior highlands, bring with them temperatures that make Manchuria much colder than might be expected from its position. By comparison, Mukden lies on about the same degree of latitude as Ithaca, New York, and the latitude of Harbin corresponds approximately to that of Portland, Oregon, or of the southern part of Maine. During the 3 months of December, January, and February, however, the average mean temperature of Harbin is 5.6° F. below that of Nome, Alaska, and nearly 12° F. colder than in Archangel. In Mukden, average winter temperatures, while milder, still are about 5° F. lower than those of St. Paul, Minnesota, and nearly 15° colder than at Ithaca.

As a result, winter freezing extends to a depth of from 5 to 8 feet, and the soil thaws out completely only by April to June in most of the agricultural areas. In the northern highlands of the Khingan Range the soil may be permanently frozen to a depth of more than 12 feet (*1*).

Summer temperatures, however, are quite suitable for agriculture in a large part of Manchuria. This is not true of the elevated regions of northwestern Manchuria or of certain parts of the Amur Valley, where the frost-free period is under 130 days. But, in the remainder of North Manchuria, there are between 130 and 160 frost-free days; and mean monthly temperatures are slightly higher than those of St. Paul and Ithaca. In Mukden, representing South Manchuria, June, July, and August temperatures are nearly as high as those of Lincoln, Nebraska; and the frost-free season is around 170 days. (See fig. 3.)

Precipitation

The year, with respect to precipitation, divides itself into a wet and a dry season. Winters are dry, with the winds that blow outward from the dry interior

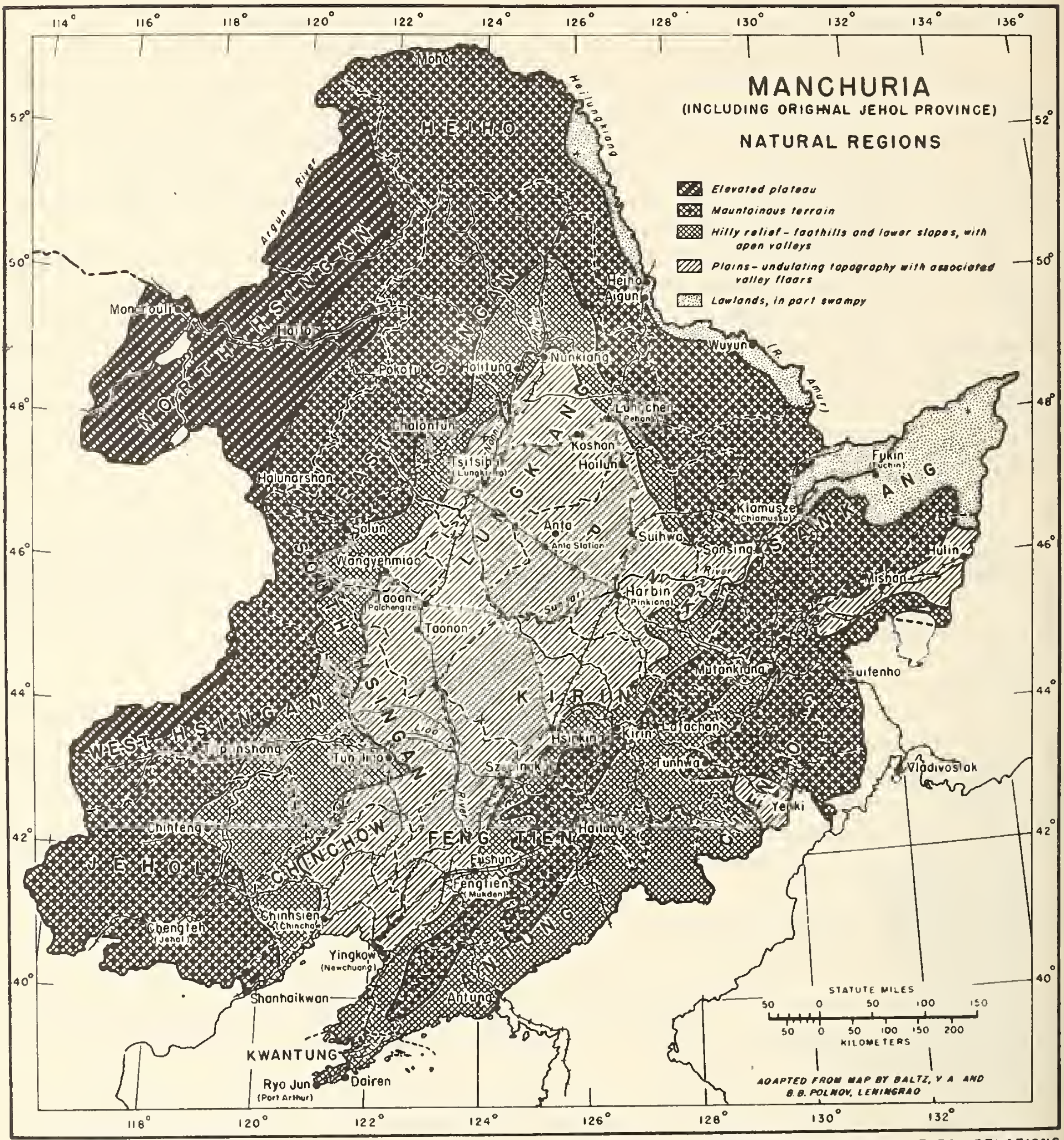

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FIGURE 2.-Map of Manchuria showing natural regions.

absorbing moisture rather than depositing it. As summer approaches, moisture is carried inward from the sea and the wet season is inaugurated. Consequently, between 80 and 90 percent of the total precipitation falls during the months of May through September, with the heaviest amounts usually during the 2 months of July and August (table 1).

Since the moisture supply originates over the sea, however, a considerable variation in total amount is found in different parts of the country. This, in general, is governed by distance from the sea and, locally, by such factors as elevation and the height of mountain barriers eastward. The result, speaking broadly, is a succession of precipitation zones going from the southeast toward the northwest, in which each zone is more arid than the one preceding it. These zones range from the humid, along the east, through the semiarid, and finally to the quite arid in the west (see fig. 4). The dryness of some of the inland areas is an important factor limiting agricultural production.

TABLE 1.–*Average monthly and annual precipitation at various stations in Manchuria*

STATION	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	YEAR
	Inches	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
Manchouli . . .	0.1	0.0	0.1	0.2	0.6	1.5	3.6	2.3	1.4	0.1	0.1	0.1	10.1
Hailar	0.1	0.1	0.1	0.2	0.6	1.9	3.4	3.1	1.8	0.2	0.2	0.1	11.8
Mientuho . . .	0.2	0.2	0.1	0.3	0.8	2.6	3.7	3.2	3.3	0.3	0.2	0.2	15.1
Tsitsihar . . .	0.1	0.1	0.1	0.3	1.2	3.4	5.4	3.1	1.2	0.5	0.1	0.1	15.6
Mutankiang . .	0.1	0.2	0.3	1.1	2.0	4.6	3.9	3.3	2.1	1.1	0.9	0.2	19.8
Chalantun . . .	0.1	0.1	0.2	0.4	1.1	3.5	6.1	4.2	2.9	1.1	0.2	0.1	20.0
Harbin	0.2	0.2	0.7	0.6	1.6	4.2	6.7	4.2	1.5	0.8	0.6	0.2	21.5
Dairen	0.8	0.4	0.7	1.3	1.5	2.0	5.8	2.8	3.2	1.4	1.2	0.3	21.4
Taipingling . .	0.1	0.2	0.4	1.4	1.9	4.5	4.8	2.9	2.4	1.4	1.2	0.3	21.5
Yingkow	0.6	0.6	0.7	1.3	1.9	2.4	5.2	6.2	2.9	1.8	0.6	0.1	24.3
Mukden	0.2	0.3	0.5	1.7	1.7	4.3	6.0	6.2	2.0	1.6	0.7	0.1	25.3
Imienpo	0.3	0.4	0.9	0.9	2.4	5.2	6.8	5.1	3.1	1.6	1.2	0.4	28.3
Changchun . . .	0.4	0.3	0.9	1.2	2.7	5.4	8.5	4.6	2.2	1.6	0.6	0.1	28.5

Calculated from data by WOEIKOFF, A. D. CLIMATIC CONDITIONS OF HORTICULTURE IN MANCHURIA. Agr. Branch, Land Dept., Chinese East. Ry. 55 pp., illus. 1928. [In Russian; English Summary, 23 pp.]

The concentration of rainfall within the important months of the growing season, however, helps to produce larger yields than otherwise would be obtained. Likewise, the normally dry autumn weather hastens maturity and facilitates harvesting, making conditions that are almost ideal for such crops as kaoliang, soybeans, and millet. But moisture conditions border on the unfavorable for wheat. This crop matures and must be harvested at a time when rains are the heaviest. The high humidity encourages diseases, such as rusts and smut, and interferes with harvesting.[2]

Soils

As might be expected from differences in topography and rainfall, the soils of Manchuria differ a great deal both in their technical classification and in those characteristics that affect agricultural production. One large group is made up of calcareous soils (Pedocals), which appear to occupy the western two-thirds of the Manchurian plain and the mountains and valleys westward of it, including the upper Nonni Basin. Information about these soils is scarce. Chernosems have been reported in the upper Nonni, and Light Chestnut Earths have been noted along the Chinese Eastern Railway west of the Great Khingan Range. The abundant supply of minerals that usually accompanies soils of this category makes for a high degree of natural fertility, and the presence of free calcium carbonate helps to maintain good tilth.

There are, however, large areas of saline and alkaline soils in the western half of the plain and along the lower Liao (*10*). Travelers report that southward from Tsitsihar sand and alkali spots form prominent features on the landscape and large parts of the area are devoted to the grazing of livestock. If, however, as a liberal estimate, one takes 5 million acres of land to be the amount affected by these conditions, about 85 percent of the total area of the plain remains unaffected.

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[2] UNITED STATES BUREAU OF AGRICULTURAL ECONOMICS. THE WHEAT AND FLOUR INDUSTRY IN MANCHURIA. Foreign News on wheat, Wh-5, 7 pp., illus. Washington, [D. C.] 1927. [Mimeographed.]

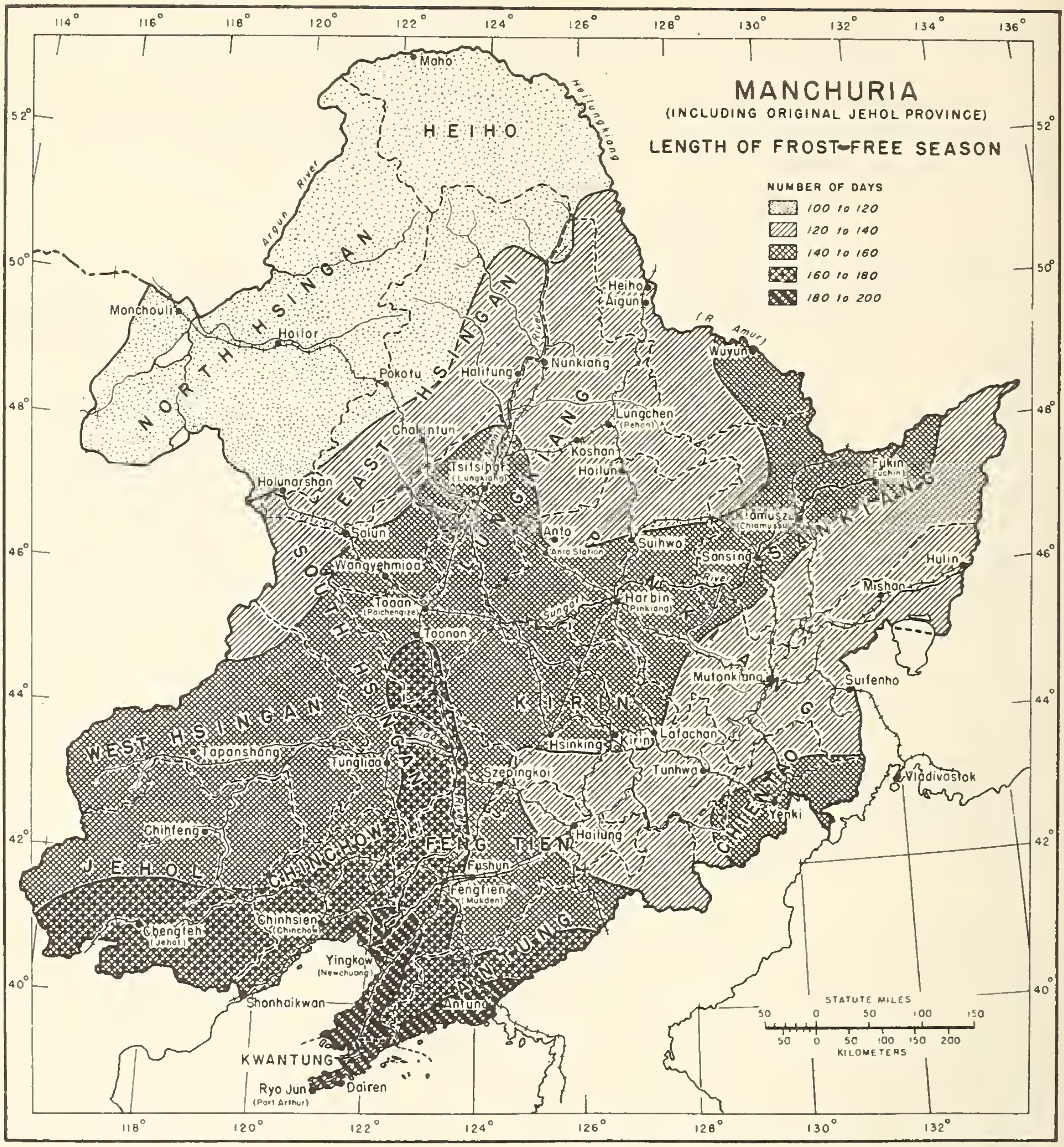

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FIGURE 3.—Map of Manchuria showing length of frost-free season in various regions.

Probably of greater total importance for agriculture are the podzolized soils, the Podzols, and the alluvium that lie within the better watered parts of the remainder of Manchuria. This group includes the important soils of the eastern third of the plain, the fertile areas of the Hulan-Hailan region, the lower Sungari, Ussuri, and Amur, and those within the mountains of eastern and southeastern Manchuria.

In North Manchuria the soils of this group are often still rich with much of the supply of minerals and organic matter originally present. Although of heavy texture, an excellent granular structure is still retained, and they can be readily worked even shortly after rain has fallen (*9*). In South Manchuria, a longer period of cultivation appears to have depleted them of organic matter, to the detriment of the soil. Structurally they are poor, the small cohesive particles readily compacting (*8*). In the mountains cultivated soil is found in valleys and on slopes. Valley soils are often fertile, although there is a good deal of swampy land. On slopes, existing methods of cultivation have already resulted in serious losses by erosion.

While not uniformly favorable, therefore, a review of the natural factors affecting agricultural production in Manchuria still allows the conclusion that this region on the whole is well suited to the usual forms of a temperate-zone agriculture.

PRE-WAR AGRICULTURE[3]

Cultivated Land

The amount and its location

Official estimates placed the land under cultivation in 1936 at around 39 million acres (table 2). About 84 percent of this was located in the Provinces wholly on or bordering on the central plain. Only 16 percent was located in the remaining Provinces, which contain 57 percent of the total surface area of Manchuria. Roughly 60 percent was in South Manchuria.

Size of farms

The average size of farms in Manchuria is large compared with that in China proper or in Japan. In North Manchuria, this is calculated to be about 16 acres. Many farms are, however, from 150 to 200 acres in size, and individual fields may be as much as two-thirds of a mile in length (*9*).

In South Manchuria, where the first settlements were made, and through which successive waves of immigrants have passed, the land is almost fully occupied. Here the average size of farm approaches that of Shantung, being somewhere around 6 acres. Between 10 and 15 percent of all farms, however, appear to be above 25 acres in size; and farms of more than 50 acres are to be found.

Colonization and tenure

Settlement by Chinese farmers began in lower Manchuria some 200 years ago. Large numbers did not migrate to Manchuria, however, until restrictions on that movement were removed by the Manchu regime in 1878. The largest number went during the decade prior to 1930, when as many as a million immigrants entered Manchuria from China in a single year. As a colonizing movement, this migration stopped when the Japanese seized Manchuria in 1931.

While the settlement of Manchuria by Chinese farmers may in some respects be likened to the settlement of western United States, the two situations are not entirely similar. Instead of entering Manchuria with a pioneering spirit and an urge to establish new homes in an expanding country, most Chinese settlers left old homes because of pressure on the land and with regret. Generally they went more as refugees than as pioneers (*7*).

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[3] Only a relatively small amount of the data available for this region can be accepted as precise. For the most part, the data given are to be looked upon merely as representing the best estimate available.

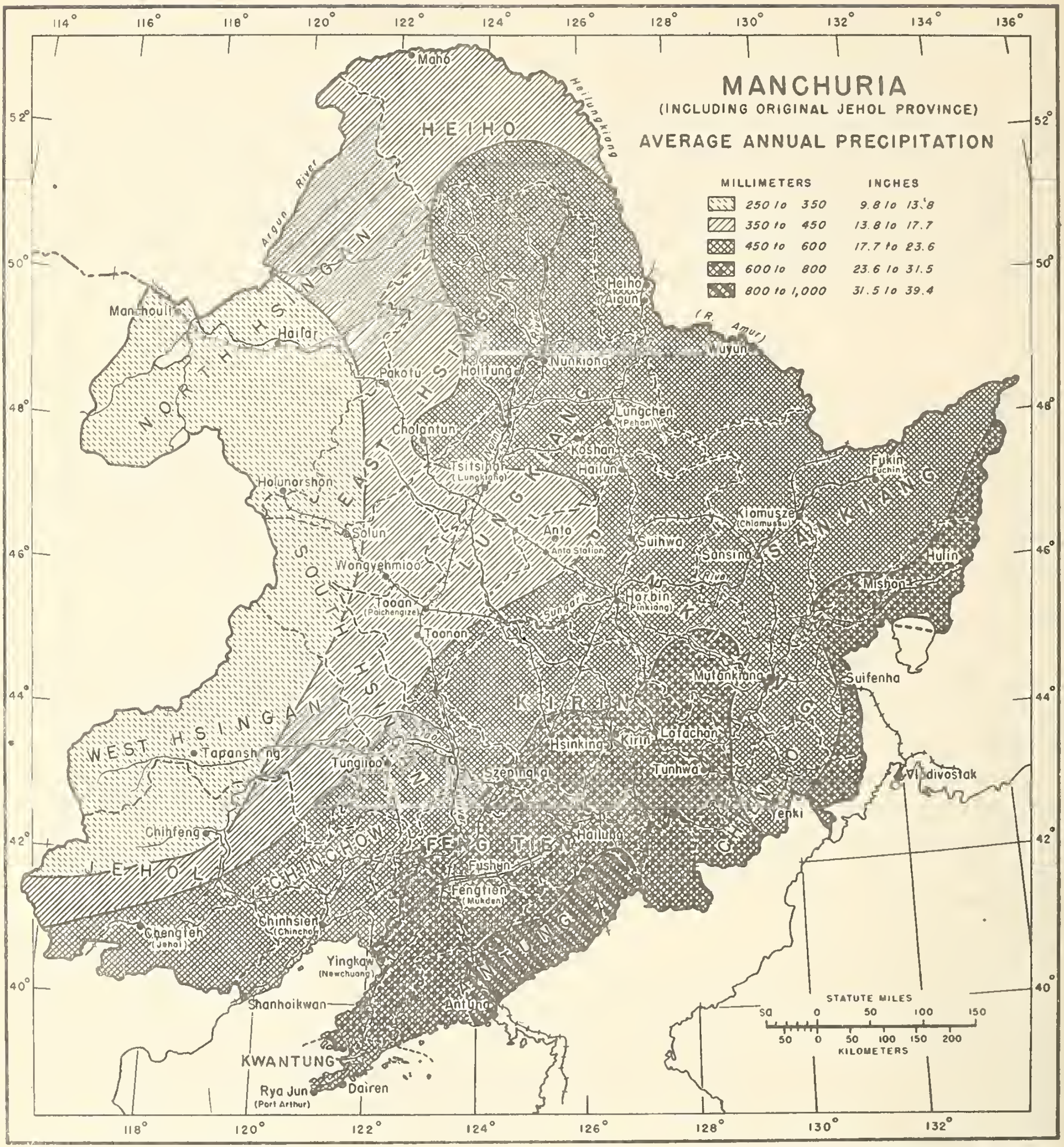

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FIGURE 4.—Map of Manchuria showing average annual precipitation in various regions.

Arriving in Manchuria, also, colonists did not find land available for free settlement or usually to be obtained upon the fulfillment of certain easy terms. Rather, the undeveloped land was already held in large tracts by government, semiofficial or private companies, and wealthy individuals, with whom the poverty-stricken and often ignorant colonists had to come to terms. Certain of these landholders dealt fairly with the new arrivals, but also there were many who took advantage of them. In the

TABLE 2.–*Estimates of arable land in Manchuria*

JAPANESE OFFICIAL ESTIMATES[1]				ESTIMATES BY E. E. YASHNOV[2]			
		ARABLE LAND				ARABLE LAND	
PROVINCE	TOTAL AREA	CULTIVATED	NOT CULTIVATED	REGION	TOTAL AREA	CULTIVATED	NOT CULTIVATED
	Sq.miles	*1,000 acres*	*1,000 acres*		*Sq.miles*	*1,000 acres*	*1,000 acres*
NORTH MANCHURIA[3]				Southern . . .	10,046	3,780	513
Pinkiang	55,731	8,833	7,332	Eastern . . .	26,662	1,980	5,148
Lungkiang . . .	48,508	5,192	15,357	Anta	28,308	5,787	4,329
Sankiang	41,523	1,858	11,182	Tsitsihar . .	75,852	1,116	13,149
Heiho	42,399	133	2,599	Potune	15,560	2,142	1,629
East Hsingan . .	41,216	[4]100	[4]802	Lower Sungari	35,907	2,475	7,317
North Hsingan .	61,927	[4]20	[4]4,015	Harbin	11,505	2,691	720
				Ussuri	16,229	252	5,139
				Amur	52,192	135	4,266
				Barga	59,906	18	4,374
TOTAL	291,304	16,136	41,287	TOTAL[5] . . .	332,167	20,376	46,584
SOUTH MANCHURIA[3]							
Kirin	34,714	7,511	3,557				
Chientao	11,349	409	621				
Antung	18,619	1,034	392				
Fengtien	33,029	7,212	2,022				
Chinchow	15,236	2,852	275				
Jehol	37,292	1,932	585				
West Hsingan . .	31,046	[4]500	[4]1,267				
South Hsingan .	30,510	[4]1,000	[4]878				
TOTAL	211,795	22,450	9,597				
ALL MANCHURIA .	503,099	38,586	50,884				

[1] For 1936. Except for the four Hsingan Provinces, data are compiled from MANCHURIAN AGRICULTURAL PRODUCTS INSTITUTE. AGRICULTURAL PRODUCTS IN MANCHOUKUO. 32 pp., illus. Hsinking, 1938. For the four Hsingan Provinces, data are estimated from figures given as "agricultural area," Far East Yearbook *(4)*. See footnote 5, below.

[2] Compiled from YASHNOV, E. E. COLONIZATION PROSPECTS IN MANCHURIA. *(11. p. 3 of English Section)*

[3] This division into North and South Manchuria is an approximate one based on Provincial boundaries. Each division, as here defined, is made up of those Provinces considered to lie wholly or mainly within it.

[4] A part of the territory included in this estimate is placed in South Manchuria in the Japanese estimate. That is true particularly for Yashnov's Southern and Eastern regions, which include a great deal of the cultivated portions of Kirin Province shown as part of South Manchuria in the Japanese estimate.

[5] Estimated from data for total "agricultural area," reported as follows (converted from hectares): East Hsingan, 902,000 acres; North Hsingan, 4,035,000; West Hsingan, 1,767,000; South Hsingan, 1,878,000 acres.

long run, nevertheless, many of the immigrants gained a chance for a better livelihood than in Shantung from which they came *(12)*.

Estimates indicate that before the war approximately 50 percent of the farming population of Manchuria were full owners of the land they cultivated. About 20 percent were estimated to be partial owners, and about 30 percent full tenants *(6, 1939 p. 754)*.

Crop Production

Crop regions

Manchuria is often though of as a land of soybeans.[4] Slightly more land actually is devoted to the production of this crop than to any other, but the crops of Manchuria are diverse. The following divisions indicate in a general way the important pre-war crop regions and their principal crops.

---

[4] For Manchuria, by soybean is meant the yellow soybean.

Kaoliang-millet-soybean region. This region, principally, is the southern part of the Manchurian plain with adjoining foothills and valleys. It also includes the lower part of the Liaotung Peninsula and areas along the western part of the plain extending into a part of North Manchuria. The principal feature of its crop pattern is the predominance of kaoliang. This is a tall-growing grain sorghum, which is drought-resistant, and which is well adapted to the warmer temperatures prevailing. Its grain forms an important element in the human diet, and almost everywhere it is the most important of the grains fed to livestock. In the eastern part of this region, the second most important grain is the soybean. Millet, mainly Italian millet, grown as a foodstuff is third. In the drier western part, millet is second and soybean third. Some maize is grown, but there is little wheat, the heavy summer rainfall making conditions inhospitable for that crop. In this region, also, are raised most of the cotton, nearly all the apples, and a large part of the flue-cured tobacco grown in Manchuria. On the sandy soils, large quantities of peanuts are produced.

Maize-soybean-kaoliang region. This is a relatively small region in the mountains of southeastern Manchuria, including eastern Fengtien Province and nearly all of Antung Province (table 3). With the more abundant precipitation available, maize produces more grain per unit of land than kaoliang. For the region as a whole, kaoliang is only third in importance, soybeans being second. There is some millet, and rice is raised in fair quantity, especially near the Korean border.

Soybean-millet-kaoliang region. In this region are the northern part of the Manchurian plain and the mountainous territory eastward in Kirin, Chientao, and Pinkiang Provinces up to a line roughly defined by the Chinese Eastern Railway. It is one of the real centers of soybean production, this crop usually occupying between 30 and 40 percent of the cultivated land. Soybeans are grown mainly as a cash crop. For local consumption, millet, kaoliang, and small quantities of other cereals are produced. The potato also is a common crop, and a large part of the flax, hemp (for fiber), and perilla seed produced in Manchuria come from this region and from the one farther north.

Soybean-wheat-millet region. This region includes territory roughly north of the Chinese Eastern Railway - in the upper Nonni Basin, on the upper central Manchurian plain, and the cultivated areas of a large part of northeastern Manchuria. Soybeans

TABLE 3.–*Percentage of total cultivated area in Manchuria occupied by principal crops, by Provinces, 1935*[1]

PROVINCE	SOY-BEANS	OTHER BEANS	KAO-LIANG	MILLET	GLUTINOUS MILLET	MAIZE	WHEAT	PADDY RICE	UPLAND RICE	OTHER CEREALS	SESAME	OTHERS
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Heiho . .	3.5	2.0		15.4	-	26.5	29.6	-	-	19.0	-	4.0
Lungkiang	25.4	2.2	11.9	20.5	5.7	9.2	9.8	0.2	-	10.2	1.8	3.1
Sankiang	32.5	0.5	10.1	17.7	-	9.0	22.3	0.2	0.1	4.8	0.1	2.7
Pinkiang	26.5	1.7	13.6	20.0	1.5	8.5	15.0	0.4	0.4	8.7	1.1	2.6
Kirin	30.7	3.2	21.7	21.5	0.7	6.9	2.4	0.8	1.3	7.7	0.3	2.8
Chientao	30.4	3.9	3.1	22.6	0.1	9.0	0.7	6.6	0.1	15.0	0.2	8.3
Antung	21.7	4.3	13.4	7.6	-	37.6	0.4	3.4	1.9	4.9	0.1	4.7
Fengtien[2]	23.0	3.2	35.1	11.8	0.1	8.1	2.1	1.2	1.8	4.8	-	4.8
Chinchow	11.9	4.2	42.0	19.5	0.1	6.9	0.8	0.1	0.5	8.5	-	5.5
MANCHURIA	25.5	2.7	21.6	18.8	1.3	9.3	7.5	0.8	0.9	7.5	0.6	3.5

[1] MANCHOUKUO AGRICULTURAL PRODUCTS SURVEY ASSOCIATION. CROP REPORT, FIRST REPORT, 1936. 44 pp., illus. Dairen. 1936. [In Japanese.]

[2] Four percent of the total is not accounted for in the figures for Fengtien Province.

are first in importance, but the region is distinguished by the presence of wheat as a major crop. This ranks as the second most important crop in the eastern part, but in the drier western portion millet is second, and wheat is third. Potatoes, maize, glutinous millet, and buckwheat are also grown. Most of the sesame produced in Manchuria is grown in the western part of this region.

Cold regions along the Amur. This is a small, cold, and relatively unknown agricultural region along the Manchurian-Siberian border. One group of crops raised contains such grains as spring wheat, spring barley, spring rye, and oats, all of which can be planted early in the season while the ground is still cold. Another group consists of crops which, although planted later, will mature quickly. In this group are buckwheat and certain short-seasoned beans and millets. Wheat occupies nearly half of all the land cultivated, and there is little or no production of kaoliang and yellow soybeans.

Total acreage and total production

Of an annual average total of 33,600,000 acres reported seeded to the principal crops during 1934-38 about 23,000,000 were planted to cereals, 9,600,000 were in beans, and 1,000,000 were in peanuts, oil-bearing seeds, and fiber crops. (See table 4.) No figures were reported for the amount of land in vegetables. The 1936 acreage of apples was estimated at 14,000 acres.

Taken individually, the soybean acreage came first, with about 8,700,000 acres. Kaoliang, with 7,300,000 acres, was second; and millet, with 6,300,000, was third. Maize and wheat occupied 3,300,000 and 2,700,000 acres, respectively.

With respect to production, kaoliang was first, with an average annual production of slightly over 4,400,000 short tons. Soybeans followed as a close second, with a total production slightly under that figure. Of the other important crops, the average annual production of millet was estimated to be 3,300,000 tons. That of maize was 2,200,000 and that of wheat only 1,000,000 tons. The average total production of all cereals amounted to about 12,700,000 short tons; that of all beans, 4,700,000 tons. (See table 4.)

Manchuria is sometimes thought of as producing more soybeans than any other country of the world. The above figure, amounting to 146 million bushels, places Manchuria only third. China, with about 225 million, comes first; and the United States, with 196 million in 1943, now is second.

Farming practices

Farming methods in Manchuria follow closely those of North China. Among the implements used is a wooden-beamed plow, which digs into rather than turns the soil. In Northern Manchuria this is a large plow, drawn by a team of from 3 to 5 horses. Also used are a wooden spike-toothed drag harrow and a simple planter with two or three drill spouts. Larger mechanical equipment has been experimented with in several different places, but it has not come into general use.

One special feature of Manchurian farming is the system of ridge culture often employed. Ridges sometimes are built up in the rows after plants are well established, by plowing against them soil from between the rows. In North Manchuria, vast areas of tilled land are kept continuously in ridges of quite large size, running due north and south. Although old ridges may be broken up and new ridges formed where furrows have been, the land is seldom leveled off. Soybeans, kaoliang, or other similar crops are planted in the center of the ridge, but each ridge holds two rows of such crops as wheat and millet. Farmers report that this method results in a better aeration during the rainy summer season, and it is an effective help in controlling weeds. A further claim is made that ridges thaw out and warm up earlier in the spring than could be expected if the soil were leveled, and winter snows are held on the fields (9).

Fertilization practices are varied. In the more intensively cultivated regions, the ordinary farm-supplied manures, such as stable manure, night soil, and compost, are carefully collected and utilized. These are applied to different crops in the rotation, in quantities depending mainly on the amounts available. In North Manchuria, however, these materials are often not utilized, the farmers depending largely upon rotation and the natural fertility of the soil. Bean cake and commercial fertilizers are sometimes used on such crops as paddy rice but otherwise in Manchuria to quite a limited extent.

TABLE 4.–*Acreage, production and yield per acre of important crops in Manchuria, average 1934-38*

CROP	ACREAGE[1]	PRODUCTION		YIELD PER ACRE	CROP	ACREAGE	PRODUCTION		YIELD PER ACRE
	1,000 acres	*1,000 sh.tons*[2]	*1,000 bushels*[3]	*Bushels*		*1,000 acres*	*1,000 sh.tons*	*1,000 bushels*	*Bushels*
Kaoliang . . .	7,322	4,422	157,944	21.6	Other beans . .	899	351	11,684	13.0
Millet	6,299	3,276	131,041	20.8	TOTAL BEANS	9,577	4,713	—	[4]984
Maize	3,281	2,196	78,421	23.9	Peanuts	[5]275	121	—	[4]882
Wheat	2,686	996	33,216	12.4	Perilla	[6]404	139	—	[4]688
Rice	427	610	27,092	39.0	Hempseed . . .	[6]294	55	—	[4]375
Upland rice .	267				Cotton	[7]67	18	—	[4]540
Other cereals	2,651	1,226			Tobacco (Flue-cured) .	[7]8	4	—	[4]1,047
TOTAL CEREALS	22,933	12,726	—	[4]1,110	TOTAL MISC. .	1,048	337	—	—
Soybeans (yellow)	8,678	4,362	145,393	16.8	GRAND TOTAL .	33,558	17,776	—	—

[1] Except as otherwise indicated, data for 1934-37 are from DAWSON, OWEN L. OUTLOOK FOR MANCHURIAN SOYBEANS 1937-38 AND REVIEW OF 1936-37, Rpt. No. 1, 23 pp., illus. Shanghai. January 25, 1938, [Typewritten.] and for 1938 from JAPAN-MANCHOUKUO YEAR BOOK (5).

[2] Calculated from table 8 of DAWSON, OWEN L. ANNUAL CROP RESUME FOR CHINA AND MANCHURIA 1940 INCLUDING COMMENTS ON AGRICULTURAL MARKET CONDITIONS AND OUTLOOK FOR 1941. U. S. Cons. Rpt. 8042, 80 pp., illus. Shanghai, March 6, 1941. [Typewritten]

[3] Converted into bushels of the following weights: Kaoliang (56 pounds), Millet (50), Maize (56), Wheat (60), Rice (45), Soybeans (60), other beans (60 pounds).

[4] Pounds.

[5] Figure is based on the average production, using the average yield for 1938 (0.4 metric ton per acre), calculated from data in FAR EAST YEAR BOOK (4).

[6] Figure is based on the average production using the average yield for the years 1935 and 1938 (perilla seed equal to 0.312 metric ton per acre; hempseed equal to 0.170 metric ton per acre), calculated from data reported in FAR EAST YEAR BOOK (4).

[7] Figure is based on the average production using the average yield for the years 1935, 1937, and 1938 (cotton equal to 0.245 metric ton per year; tobacco equal to 0.466 metric ton per year), calculated from data reported in FAR EAST YEAR BOOK (4).

Crop yields

The average yields per acre of the principal crops of Manchuria are neither strikingly high nor low, but they may be considered good. The calculated yield of soybeans, over the 5-year period 1934-38, averaged 16.8 bushels per acre as compared with 17.2 for China and 16.1 for the United States (1931-39). The average yield of kaoliang was calculated to be 21.6 bushels per acre, which is about the same as that of China proper but nearly double that of grain sorghums in the United States. The average for maize of 23.9 bushels per acre is approximately that of the United States.

The yield of 12.4 bushels per acre for wheat, however, although about the same as in the United States, is below the 15.9 bushels per acre obtained in China, as might be expected considering the relatively unfavorable conditions under which wheat is grown in Manchuria. These rather good yields for most crops bear out the conclusion that Manchuria, as a whole, is a region well adapted to cultivated agriculture (table 4).

Animal Husbandry

The practice of animal husbandry in Manchuria follows two general patterns. One is a pastoral pattern. This is found on the plateau and on the rolling hills along the Manchurian-Mongolian border, that is, in the four Hsingan Provinces and parts of Jehol. Here, where the climate is semiarid to arid, cultivated agriculture is hazardous or impossible; and large parts of this area are still Mongol in population and atmosphere. Land stated to be available for grazing in this region includes 22,500,000 acres classified as pastoral land, and another 13,400,000 designated as "agri-pastoral" (*4*). Considering the dryness of the climate and the potential erosive strength of the strong winter winds, most of the undeveloped land of both types certainly should continue to be used for grazing purposes.

Sheep raising predominates. The present population of sheep and goats in this region is estimated at somewhere around 1,800,000 head. On the ranges cattle and horses are also raised, though in smaller numbers. Practically all the camels of Manchuria are found in these parts. (See table 5.)

The second pattern of livestock production in Manchuria is found in regions of settled agriculture as a minor adjunct to crop raising. The principal types of livestock raised are swine and poultry, of which one or a few head per farm are kept. These are not properly fed, according to Western ideas; they subsist largely on pickings from fields and villages, supplemented by feedstuffs of little value for other purposes. The common breeds, while poor when judged by most Western standards, at least have the virtue of being hardy and better adapted to local conditions than the more highly developed breeds. Well-developed dairy industries are found only around a few of the principal cities.

TABLE 5.–*Numbers of livestock in Manchuria, by specified geographic division*

GEOGRAPHIC DIVISION	CATTLE	HORSES	MULES	DONKEYS	CAMELS	PIGS	SHEEP	GOATS	POULTRY
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Jehol and 4 Hsingan Provinces[1].	636	244	22	108	11	838	1,775		
Other Provinces[1] . . .	641	1,565	546	513	(2)	5,261	283		
All Manchuria	[3]1,453	[1]1,809	[1]568	[1]621	[3]11	[3]5,762	[4]1,817	[4]993	[1]9,861

[1] 1935 data. [2] Less than 500. [3] 1935-37 average. [4] 1936-37 average.

Data for 1935 from Japan-Manchoukuo Year Book (*6*), for 1936 and 1937 from the FAR EAST YEAR BOOK (*4*).

Agricultural Products in Foreign Trade

Of the total value of all products exported, average 1933-37, approximately 70 percent was contributed from agricultural and animal products. Soybeans and soybean products alone accounted for 49 percent of the total. The annual export of soybeans averaged about 2,300,000 short tons. Soybean oil averaged about 88,000 tons which, if converted into its equivalent in soybeans, brings the total, in terms of soybeans, to about 3,200,000 tons. Further amounts of other beans exported raises the total average quantity to about 3,400,000 tons. In addition, about a million tons of soybean cake were exported. (See table 6.)

TABLE 6.-*Foreign trade of Manchuria in important agricultural products, 1933-37*

ITEM	EXPORTS[1]	IMPORTS[2]	BALANCE NET EXPORTS (-) NET IMPORTS (+)
	1,000 sh.tons	*1,000 sh.tons*	*1,000 sh.tons*
Black beans	29.5	—	-29.5
Green beans	21.5	—	-21.5
White beans	3.0	—	-3.0
Yellow beans	2,276.8	—	-2,276.8
Green beans (small)	30.6	—	-30.6
Red beans (small)	74.7	—	-74.7
Other beans	28.3	[3] 3.7	-24.6
Peas	7.4	—	-7.4
Total legumes	2,471.8	3.7	-2,468.1
Barley	1.6	.6	-1.0
Buckwheat	37.4	—	-37.4
Kaoliang	163.1	—	-163.1
Millet	177.6	—	-177.6
Maize	101.1	—	-101.1
Rice and paddy	2.5	72.7	+70.2
Wheat	11.0	—	-11.0
Flour as wheat[4]	1.9	554.8	+552.9
Total wheat	12.9	554.8	+541.9
Other cereals	2.0	6.2	+4.2
Total cereals	498.2	634.3	+136.1
Castor seed	26.0	—	-26.0
Hempseed	57.3	—	-57.3
Perilla seed	66.6	—	-66.6

ITEM	EXPORTS[1]	IMPORTS[2]	BALANCE NET EXPORTS (-) NET IMPORTS (+)
	1,000 sh.tons	*1,000 sh.tons*	*1,000 sh.tons*
Sesame seed	18.8	—	-18.8
Soybean oil	87.9	—	-87.9
Perilla oil	13.5	—	-13.5
Soybean cake	1,099.8	—	-1,099.8
Perilla cake	21.7	—	-21.7
Peanut cake	.6		-.6
Peanuts, unshelled	32.4	0.1	-32.3
Peanuts, shelled as unshelled[5]	98.2	—	-98.2
Total peanuts	130.6	[6] .1	-130.5
Tobacco, leaf	.3	15.3	+15.0
Cotton, raw	.2	22.6	+22.4
Sugar	(7)	[8] 106.4	+106.4
Tea	(7)	5.4	+5.4
Ginseng	.3	(7)	-.3
Wheat bran	56.2	—	-56.2
Fodder	.4	—	-.4
Silk, wild raw	1.5	—	-1.5
Silk waste, wild raw	1.4	(7)	-1.4
Wool, sheep	2.8	[9] .6	-2.2
Wool, goat	.1	—	-.1
Bristles	1.3	—	-1.3
Hides	1.2	[10] 1.1	-.1

[1] Exports less reimports.

[2] Imports less reexports.

[3] Includes peas.

[4] Flour ÷ .7 = wheat.

[5] Peanuts shelled x 1.5 = peanuts in shell.

[6] Assumed to be "in shell."

[7] Less than 50 tons.

[8] Does not include miscellaneous types of sugar which, in value, amount to about 3.2 percent of the value of the sugar imports listed.

[9] Includes "waste wool."

[10] Does not include miscellaneous types of hides which, in value, amount to about 4.5 percent of the value of the hide imports listed.

Compiled from [MANCHURIA] DEPARTMENT OF TRADE AND FINANCE. ANNUAL RETURNS OF THE FOREIGN TRADE OF MANCHOUKUO, PART I, 1934-38. Represents the total trade of Manchuria, including Jehol and the Kwantung Leased Territory. Most of the returns were converted to short tons from piculs said to equal 60.48 kgms; therefore 1 picul x .06667 = 1 short ton.

Of the soybeans exported, about 60 percent went to Europe and most of the remainder to Japan and to China proper. Of the oil, Japan took a major part, but China also took a large quantity. Of the cake, about 80 percent went to Japan and most of the remainder to China.

The relatively unimportant place held by animal products in the export trade is indicated by the fact that the value of these products was only about 2 percent of the value of all products exported. Of the remaining agricultural products, other than soybeans and soybean products, exports of oilseeds and their oils, consisting largely of perilla, castor, and hemp, made up a significant item. The quantities of castor, and particularly of perilla, increased rapidly after 1933, much of the perilla going to the United States to be used in varnishes. Exports of peanuts totaled over

130,000 short tons (unshelled basis), and about 500,000 tons of cereals, made up mostly of kaoliang, millet, amd maize, entered trade channels.

The quantity of cereals exported, however, was more than balanced by the import of wheat and wheat flour, which amounted to about 550,000 tons in terms of wheat. In addition, about 73,000 tons of rice were imported. Other items imported in important quantities were leaf tobacco, cotton, sugar, and tea. Imports also included some processed milk, dried and fresh fruits, canned meat and fish, and butter and cheese but not in quantities large enough to affect the food picture of the country as a whole.

Foodstuffs Available for Domestic Consumption

Exact data concerning the diet of the population of Manchuria are lacking. In general, as in China proper, cereals constitute the principal item in the diet of a large proportion of the population. Vegetables, tubers, and soybean products make up most of the remainder. Animal products are not consumed regularly by the great majority of the people, and fruit is eaten in small quantities only.

The average consumption of the two principal items of the diet, cereals and beans, can be calculated by taking into account the total quantities produced, the quantities exported or imported, and the quantities estimated to have been used domestically for purposes other than food. The results of such a calculation show that there was annually available per person during 1933-37 an average of about 617 pounds of cereals and 66 pounds of beans, in terms of the agricultural product (table 7). For China proper, by comparison, the quantities are estimated at 491 pounds of cereals and 71 pounds of beans per person.

Since other items in the diet are probably not greatly different in the two areas, the people of Manchuria were relatively well fed before the war. Also agricultural products do not appear to have been exported at the expense of supplies needed to feed the domestic population.

AGRICULTURAL POTENTIALITIES

Arable Land

Manchuria is one of the few regions of the Temperate Zone in which undeveloped land suitable for agricultural purposes may still be found in rather large quantities. Exact information concerning the total amounts and the quality of this land will not be available until some future time when careful surveys can be made. For the present, there exist certain estimates from which a rough notion of the existing resources may possibly be derived.

One estimate deserving consideration was made by E. E. Yashnov, a Russian economist who studied the situation in North Manchuria only. A condensed account of his studies, published in English in 1928, has received widespread attention among those interested in this problem *(11)*. His own statement concerning the accuracy of the estimates submitted by him is given as follows after a discussion of the uncertainties involved *(11, p. 2)*:

> All of this, however, is not justification enough entirely to refute the size of the colonization fund which we have arrived at. In the majority of the districts described by us the areas so classified are based upon statements of a number of persons well familiar with local conditions. We were, besides, in a position to compare them with all direct and indirect material available in connection with the question under discussion. This does not guarantee the accuracy of our figure relative to each separate district, but it gives us grounds to believe that occasional errors (of exaggeration or diminution) are to a great degree leveled out in calculating the totals of the different regions and even more so in the total of the entire territory studied by us. The most inveterate skeptic must declare the totals of the colonization fund as calculated by us to be fairly probable.

A second important primary source of information is found in official Japanese estimates, of which the one reported for 1936 is considered here. Since the Japanese have long studied conditions in South Manchuria, their estimates for that part of Manchuria may perhaps be accepted as fairly reliable. With regard to North Manchuria, the Japanese total for land already cultivated does not agree with that reported earlier by Yashnov. This is not surprising, since a considerable expansion of the cultivated acreage occurred subsequent to Yashnov's study. No significant difference appears, however, when comparing estimates for the total of arable land, including land cultivated and not yet cultivated.

TABLE 7.—*Supply and distribution of cereals and beans in Manchuria with per capita comparison with China proper, 1934-38*

ITEM	PRODUCTION[1]	FOREIGN TRADE[2]		AVAILABLE FOR UTILIZATION[3]		AVAILABLE, PER CAPITA, FOR HUMAN CONSUMPTION	
		EXPORTS	IMPORTS	TOTAL	LESS FEED AND SEED[4]	MANCHURIA[5]	CHINA PROPER[6]
	1,000 short tons	*1,000 sh. tons*	*1,000 sh. tons*	*1,000 short tons*	*1,000 short tons*	*Pounds*	*Pounds*
Wheat	997	—	542	1,539	1,308	73.6	103.4
Kaoliang	4,422	163	—	4,259	3,620	203.9	32.8
Millet	3,276	177	—	3,099	2,634	148.4	38.8
Corn	2,195	101	—	2,094	1,780	100.3	30.2
Rice	610	—	[7]86	696	592	33.3	240.3
Other cereals	1,226	34	—	1,192	1,013	57.1	45.9
Total cereals	12,726	475	628	12,879	10,947	616.6	491.4
Soybeans	4,362	[8]3,157	—	1,205	1,024	57.8	29.8
Other beans	350	184	—	166	141	7.9	41.2
Total beans	4,712	3,341	—	1,371	1,165	65.7	71.0

[1] Average 1934-38. Dawson, Owen L. ANNUAL CROP RESUME FOR CHINA AND MANCHURIA, 1940 INCLUDING COMMENTS ON AGRICULTURAL MARKET CONDITIONS AND OUTLOOK FOR 1941. Shanghai, March 6, 1941. [Typewritten.] See table 3, p. 180.

[2] Average 1933-37. Represents total trade of Manchuria, including Jehol and the Kwantung Leased Territory. Compiled from [MANCHURIA] DEPARTMENT OF TRADE AND FINANCE. ANNUAL RETURNS OF THE FOREIGN TRADE OF MANCHOUKUO, PART I, 1934-38. Shipments by the Kwantung Army are apparently not included. Exports less reimports; imports less reexports.

[3] Average annual production plus net imports or minus net exports equals quantity available for utilization.

[4] Fifteen percent assumed as utilized for feed and seed on the basis of data presented (p. 66) in ECONOMIC BUREAU, CHINESE EASTERN RAILWAY. NORTH MANCHURIA AND THE CHINESE EASTERN RAILWAY. 454 pp., illus. Harbin. 1924. See also LUBIMOFF, L. I. THE AGRICULTURAL FUND AND BALANCE OF GRAIN TRADE IN MANCHURIA. Manchuria Monit., No. 4, [English Sec.] pp. 1-11. 1929.

[5] The average population of Manchuria including Jehol, the Kwantung Leased Territory, and the South Manchuria Railway Zone is calculated to have averaged approximately 35,500,000 persons for the period 1933-37, according to figures reported in the Japan-Manchoukuo Yearbooks.

[6] Estimated by Office of Foreign Agricultural Relations.

[7] Rice and paddy reported at 70,500 short tons, of which 50 percent was assumed to be rice and converted to paddy basis by dividing by 0.7.

[8] Soybeans, 2,277,000 short tons, plus soybean oil in terms of beans, 880,000 tons; 1 ton of oil considered the product of 10 tons of beans.

In one sense, there is no way to estimate how much land will eventually be brought under cultivation. This will be influenced by such things as population pressure, by the extent to which conservation practices are adopted, by the quantities of fertilizers used, and by the extent to which reclamation measures are put into effect. The Japanese estimates seem acceptable, however, as roughly indicating the amount of land in different parts of Manchuria that is capable of being brought under cultivation for greater or shorter periods of time by farmers' efforts. These estimates as of 1936 include about 39 million acres already under cultivation and some 51 million acres not yet cultivated, the total being around 90 million (table 8).

TABLE 8.–*Estimated resources of arable land, by regions, 1936*

REGION	PROVINCES INCLUDED	CULTIVATED LAND		LAND NOT YET CULTIVATED				TOTAL[5]
		JAPANESE OFFICIAL ESTIMATE[1]	MINUS HIGHLY ERODIBLE LAND[2]	JAPANESE OFFICIAL ESTIMATE[1]	MINUS HIGHLY ERODIBLE LAND[2]	ESTIMATED RELATIVE PRODUCTIVE CAPACITY[3]	EQUIVALENT ACREAGE[4] (6) x (7)	(4) + (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Percent*	*1,000 acres*	*1,000 acres*
N. MANCHURIA:[6]								
Northwest Manchurian plain and adjoining valley	Lungkiang and East Hsingan	5,292	5,027	16,159	12,927	65	8,403	13,430
Northeast Manchurian plain and eastward along railway	Pinkiang	8,833	8,391	7,332	5,866	85	4,986	13,377
Amur	Heiho	133	126	2,599	2,079	65	1,351	1,477
Lower Sungari & Ussuri	Sankiang	1,858	1,765	11,182	8,946	100	8,946	10,711
Barga	North Hsingan	20	19	4,015	3,212	50	1,606	1,625
TOTAL		16,136	15,328	41,287	33,030		25,292	40,620
S. MANCHURIA:[6]								
East Central	Kirin & Chientao	7,920	7,524	4,178	3,342	80	2,674	10,198
Southeastern and Jehol	Antung, Fengtien, Chinchow, & Jehol	13,030	12,378	3,274	2,619	70	1,833	14,211
Western	South & West Hsingan	1,500	1,425	2,145	1,716	50	858	2,283
TOTAL		22,450	21,327	9,597	7,677		5,365	26,692
GRAND TOTAL		38,586	36,655	50,884	40,707		30,657	67,312

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[1] Except for the four Hsingan Provinces, data are compiled from THE MANCHURIAN AGRICULTURAL PRODUCTS INSTITUTE. AGRICULTURAL PRODUCTS IN MANCHOUKUO, 32 pp., illus. Hsinking, [1938.] For the Hsingan Provinces, data are estimated from figures given as "agricultural area," FAR EAST YEARBOOK (*4*). (See table 3.)

[2] To eliminate that part which is considered unsuited for a permanent agricultural use, which eventually will either be converted to another use or lost by erosion, 5 percent has been deducted from cultivated land and 20 percent from land not yet cultivated.

[3] An estimated figure, taking into account topography, soil, and climate in comparison with what are thought of as average conditions for the land already under cultivation. Average of cultivated land = 100.

[4] Equivalent acreage in terms of a productive capacity equal to average of land cultivated.

[5] Estimated in terms of land suited for permanent cultivation, having average productive capacity equal to average of land cultivated.

[6] This division into North and South Manchuria is an approximate one based on provincial boundaries which run roughly along the 44th parallel.

These gross figures, however, do not appear to provide an adequate understanding of the resources they are supposed to represent. In the first place, the estimates probably include land not suited to a permanent agricultural use. The existing condition in this respect has been well described by Pendleton (*9*), who made observations in the hilly section east of Harbin, from Acheng to Imienpo. Cultivation on slopes after forests had been removed was short-lived, and soil was quickly lost by erosion. Fields already abandoned were seen.

Fenzel (5) made similar observations on a trip through the mountains of Fengtien and Kirin Provinces. He wrote (*5, p. 542)*:

> We passed through regions where deforestation took place as long ago as fifty years, and as recently as five, in the subsequent areas of advancing colonization. . . . The low-lying and gently inclined or level areas continue to yield at least moderate results, but the slopes of a declivity exceeding 12 to 15 degrees change from their original color to an entirely yellow tint and a purely sandy structure within a period of 15 years of cultivation. Farmers have to abandon these fields, and they are already clearing steep slopes in search of fresh, hitherto untouched, forest soil.

Since land so obviously unsuited to permanent agricultural use is now under cultivation, a safe assumption seems to be that the estimates for land not yet cultivated not only include land of the same kind but also that the proportion is greater. This may be expected because a much larger part of the undeveloped land is in mountainous territory, and therefore a greater amount of land on slopes is included.

There is little information that one can use as a basis for an opinion as to how large a proportion of the estimated figure is made up of land of this sort. A clue would appear to exist in the amount of land still forested. Although some undeveloped forest land may be suited to a permanent agricultural use, one would probably be not far wrong if he assumed that the proportion in forests corresponds roughly to the proportion not suitable for agriculture. In this analysis, that assumption is made. Yashnov estimated that of the arable land of North Manchuria not yet cultivated about 20 percent carried a forest cover. In the case of those regions where forests do not exist, as on the grasslands of western central Manchuria, an equal proportion probably should be left to other uses, such as grazing. Accordingly, a reduction by 20 percent has been applied uniformly to the original estimate by regions.

With respect to land already cultivated, a reduction also ought to be made if one desires to state the estimate in the same terms. The amount of reduction would naturally be much less, since a large proportion of the land already cultivated is on relatively level terrain. A figure of 5 percent is arbitrarily adopted. Reduced by that amount, the quantity of land already under cultivation becomes about 37 million acres. The amount not yet cultivated is calculated to be about 41 million acres, the total being around 78 million (table 8).

The estimate for land not yet cultivated stated in those terms, however, leaves out of account ability to produce. This land, on the average, will not be as productive as that already cultivated, because farmers naturally tend to take up first the better districts and pieces of land, leaving the inferior ones for later cultivation. A better picture of the land resources, therefore, would be obtained if the land not yet cultivated were stated in terms which relate to the productive capacity of land already cultivated. Accordingly, an attempt has been made to convert the above figures into their equivalent in terms of land having a productive capacity equal to the average of land already cultivated. By productive capacity, in this instance, is meant the level of yields that might be expected, taking into account the topography, inherent soil fertility, and climate.

Since no precise measure of potential productiveness for the undeveloped areas is at hand, any estimate of this sort is naturally open to criticism. Nevertheless, in the interest of an effort to provide a clearer conception of what these resources are, such an estimate has been attempted. The land now cultivated includes extremely productive, nearly virgin, soil under favorable conditions of both topography and climate. It also includes poor soil, somewhat saline, in regions of slight rainfall. As a standard for comparison, to represent the average of land now cultivated, a condition somewhere between these extremes has been thought of, also taking into account the relative amounts of good and bad. To this hypothetical condition a value of 100 has been assigned. For each region where undeveloped soil still exists, values have been assigned in relation to this. These vary from 100, for the rich lower Sungari Valley, to 50 for the dry parts of western Manchuria (table 8). On the whole, the estimates are believed to be conservative. They indicate, on this basis, total land resources of about 67 million acres, of which, about 37 million acres are now under cultivation and somewhere around 30 million remain yet to be developed.

An examination of the details of these data shows that about 82 percent of the undeveloped land lies in North Manchuria, with the major part along the upper part of the Manchurian plain and in the lower Sungari Valley. Of the 18 percent in South Manchuria, about half is in the region of the upper Sungari and Mutan Rivers. In comparative terms, the undeveloped land, represented in this way, is greater than the amount of land available for crops in the New England States, plus that in New York, New Jersey, Pennsylvania, Delaware, and Maryland. It is about twice the amount of land under cultivation in Japan.

Population and Colonization Prospects

The estimated land resources of Manchuria can be used to arrive at some idea concerning the number of inhabitants that might be present under different stages of development. As calculated from data available for 1936, the average number of acres of cultivated land per person of the total population was 0.82 for South Manchuria, 1.93 for North Manchuria, and 1.08 for all Manchuria (table 9). Assuming a full development of the stated land resources, the total population would be about 62 million if the density were such that the average acreage per person of cultivated land was the same as for the average of Manchuria in 1936. If, however, the average amount were the same as for South Manchuria at that time, the population would be about 82 million. Were it as low as in Hopei and Shantung before the war, the figure would be about 137 million.

These figures, of course, only give a general idea as to what might be expected. The precise conditions stated will probably never actually exist. The highest figure mentioned might conceivably be reached at sometime in the future, as approximately an upper limit, if industry is highly developed. If dependent mainly upon an agricultural development, so large a population seems unlikely. On the other hand, a full development of the potential resources of arable land ought to provide a considerably larger quantity of foodstuffs than would be consumed by a population of 62 million. With the levels of production and consumption about equal to those of 1936, a population of somewhere around 90 million might be reached before Manchuria would become a net importer of foodstuffs.

Since the population in 1940 was placed at about 43 million, obviously an appreciable expansion is possible. Were this expansion to come entirely from colonists, an additional 20 to 50 million persons from other places could be accommodated. All additions will not result, however, from colonization, since a natural increase in the existing population will also occur. Whether the major part will come from natural increase, or from colonization, will depend in the main upon the rapidity with which this territory is developed.

TABLE 9.–*Estimate of population possible with different densities in relation to cultivated land*

ITEM		LAND CULTIVATED		POPULATION
		TOTAL	PER CAPITA	
		1,000 acres	*Acres*	*Thousands*
ACTUAL CONDITION REPORTED FOR 1936	North Manchuria	[1]16,136	1.93	[2]8,365
	South Manchuria	[1]22,450	.82	[2]27,457
	All Manchuria	[1]38,586	1.08	[2]35,822
CONDITIONS ASSUMED				
With all arable land cultivated, and average acres per person as for all Manchuria, 1936		[3]67,312	1.08	62,326
With all arable land cultivated, and average acres per person as for South Manchuria, 1936		[3]67,312	.82	82,088
With all arable land cultivated, and average acres per person as for average of Hopei and Shantung Provinces		[3]67,312	[4].49	137,371

[1] Data of table 3.

[2] Calculated from data of JAPAN-MANCHUKUO YEAR BOOK (6).

[3] Total arable land suited for permanent cultivation, estimated on the basis of a productive capacity equal to the average of that now under cultivation (table 8).

[4] Calculated from data of [CHINA] NATIONAL GOVERNMENT, DIRECTORATE OF STATISTICS. STATISTICAL ABSTRACT OF THE REPUBLIC OF CHINA. 280 pp., illus. Chungking. 1940.

Surplus Agricultural Products

A figure representing the maximum quantity of soybeans likely to be produced in excess of domestic requirements can be derived, assuming a full development of the estimated quantities of arable land under conditions of production, consumption, and population density approximately the same as in 1936. Under these assumed conditions, the figure can be arrived at by multiplying the total pre-war export of beans and oil, 3,400,000 short tons in terms of beans, by another figure which expresses the ratio between the amount of land under cultivation at that time and the estimated final amount. The quantity resulting from such a calculation is just a little less than 6,000,000 tons. If yields remain the same as in 1936, that would mean the produce of about 11,400,000 acres.

A larger amount might conceivably be available for export if average yields are increased through improved agricultural practices. More may be available, also, if the world demand for soybeans becomes such that it would be profitable for Manchuria to export soybeans while importing other foodstuffs. Otherwise, the quantity stated is unlikely to be reached. Recent trends in Manchuria toward industrialization will probably continue after the war, thereby increasing the number of nonagricultural workers to be fed. At the same time, an effort to reduce wheat imports by increasing the wheat acreage in Manchuria may be expected, and this would require land that in many cases could be devoted to soybeans. Larger quantities of land may also be planted to vegetables, and more soybeans may be consumed domestically, in order to improve the diet. Industrial processes in Manchuria may also utilize a part of the production. The actual surplus to be expected, therefore, will probably not reach 6,000,000 tons. And a decrease from the maximum point would begin shortly after being attained as the increasing population required more and more food for its own consumption.

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AUSTRALIAN RURAL RECONSTRUCTION AND WORLD MARKETS . . .

On January 17, 1944, the Australian Rural Reconstruction Commission submitted its first report to the Minister for Post-war Reconstruction. The aim of this preliminary report was to survey the general problem of rural reconstruction and to focus attention on certain main principles that would guide the Commission in subsequent reports.

The report reviews the history of agriculture in Australia and specifies the methods devised to aid Australian agriculture since 1929. The most important of domestic measures were: (1) The devaluation of the Australian pound in terms of the British currency, (2) a moratorium preventing foreclosure for debt, (3) compulsory reduction of wage and interest rates, (4) assistance to producers through the extension of "home consumption price" schemes, and (5) the inauguration of a comprehensive scheme of debt adjustment.

With the exception of wool, meat, and certain products produced solely for the home market, nearly every form of farming has been given government aid in Australia within the past 10 years. The Commission concluded, however, that such devices were not only politically troublesome and financially awkward to the government concerned, but that they also had the psychological effect, when long continued, of discouraging efforts to improve efficiency and remedy faults in the cost structure.

In addition to these domestic measures, the development of imperial preference under the Ottawa Agreement of 1932 assisted Australian producers of most export farm products. In the case of wheat and wool, however, imperial preference had little effect, since Empire production of these exceeded Empire requirements.

Markets and price levels, according to the Commission, are the principal economic factors that will influence land utilization and development in the post-war period. Any expansion in farming must depend upon the development of markets for the increased production. Australia, as an exporting country, has found new hope for increased world markets in the spirit of the Atlantic Charter. Should the United Nations fail permanently to increase world trade in agricultural products, only a limited expansion of agricultural production would be justifiable in Australia. The extent of the expansion in this case would be confined (1) to the requirements of any increase in Australia's population, and (2) to the production of food necessary to bring the diet of the Australian people up to a satisfactory nutritional level. In an appendix to the report the Commission assessed the effect of an increase in the Australian population upon agriculture by estimating the additional farming required to support an extra population of one million people at the average Australian standard of 1932-41. The chief items that would be consumed in larger quantities if the diet of the Australian people were brought up to a satisfactory nutritional level are milk, vegetables, fruit, and eggs. The consumption of cereals and sugar might possibly be slightly decreased.

Summarizing the position as regards markets, the Commission reports that any considerable expansion of Australian farming is dependent upon the international acceptance of the spirit of the Atlantic Charter and the terms of the Resolutions of the Hot Springs Conference; that those Resolutions only mean wider markets if the maximum of efficiency is used in Australian farming, so that costs can be kept down and products made available to the world at prices that are reasonably low.

During the war price levels have been distorted in many ways, and these distortions have had an equally important influence on both the costs of farm requirements and the prices of farm products. There will be a readjustment in the price level of goods consumed as well as products sold sometime after the end of the war. The success or failure of many farmers will depend on the relative position of these levels. The Commission considered the maintenance of a fairly stable price relationship for at least the major farm commodities to be an important post-war objective. Since a large portion of Australia's basic agricultural products are produced for export, Australian farmers are vitally interested in the stability of world prices.

Australia's experiences before the war in connection with the coordination of marketing as a means of determining the internal price level of commodities demonstrated the complexity of devising plans for a general agricultural program within the constitutional framework of the Federal governmental system. Many farm groups worked for measures that demanded an exercise of increased powers by the Commonwealth Government. The operation of wartime controls has, however, made large numbers of citizens uneasy about too much centralized control. Nevertheless, recent international commitments of the Commonwealth Government may call for considerable government intervention in order to effect agricultural adjustment. The Commission felt that centralized control would be most needed in finance, in overseas trade, in the development of an agreed agricultural policy, and in the implementation of a plan for the settlement of returned soldiers.

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